Project Connection Assessment

P2789 Red Willow Solar and Energy Storage Project

Red Willow Solar Inc.

Date: June 29, 2026

Version: V2

Classification: Public

Role	Name	Date	Signature
Prepared	Adil Juma, P. Eng.		Adil Nizar Juma -- P. Eng. - APEGA Digitally signed by Adil Nizar Juma -- P. Eng. - APEGA Date: 2026.06.29 15:24:09 -06'00'
Reviewed	Yasaman Mozafari Jovein, P. Eng.		Yasaman Mozafari Jovein -- P. Eng. - APEGA Digitally signed by Yasaman Mozafari Jovein -- P. Eng. - APEGA Date: 2026.06.29 15:44:59 -06'00'
Approved	Peyman Ahmadi, P. Eng.		Peyman Ahmadi -- P. Eng. - APEGA Digitally signed by Peyman Ahmadi -- P. Eng. - APEGA Date: 2026.06.30 12:55:41 -06'00'

PROFESSIONAL ENGINEER ALBERTA
YASAMAN MOZAFARI JOVEIN
ID: 210390
June 30 2026

PERMIT TO PRACTICE
INDEPENDENT SYSTEM OPERATOR
RM SIGNATURE: Ahmadi
RM APEGA ID #: 196963
DATE: 2026-06-30
PERMIT NUMBER: P008200
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

1 Introduction

This Project Connection Assessment evaluates the connection alternatives using the study results and other considerations, and identifies the AESO's preferred connection alternative for the approved Red Willow Solar and Energy Storage Project (the Facility), which includes the new Willow 1112S substation[1]. The conclusions in this report are based on the documents listed below which were prepared by the AESO in accordance with the AESO's Cluster Assessment Process:

- Detailed Assessment Report titled "Detailed Assessment Report Central Cluster" dated May 26, 2025, Version 3.
- Detailed Re-Assessment Study Scope titled "Detailed Re-Assessment Study Scope Central Cluster" dated May 14, 2025, Version 1.

1.1 Overview

Red Willow Solar Inc. (Market Participant) has submitted a request for system access service to the Alberta Electric System Operator (AESO) to connect its approved Facility to the AIES. The Market Participant's request includes: a request for new system access service in the Stettler area, with a Rate STS, *Supply Transmission Service*, contract capacity of 225 MW and a Rate DTS, *Demand Transmission Service*, contract capacity of 5 MW; and a request for transmission development (collectively, the Project). The scheduled in-service date (ISD) for the Project is August 31, 2028.

The Project was studied as part of the Central Cluster, which includes the Vegreville (Area 56), Lloydminster (Area 13), Wainwright (Area 32), Provost (Area 37), Alliance/ Battle River (Area 36), Hanna (Area 42), Red Deer (Area 35), Didsbury (Area 39), Caroline (Area 38), Drayton Valley (Area 30), Hinton/ Edson (Area 29), Abraham Lake (Area 34), and Cold Lake (Area 28) AESO planning areas. A total of 18 new generation and energy storage projects were studied as part of the Central cluster.

Power flow and short circuit studies were performed in the assessment for both the pre-Cluster and post-Cluster scenarios. Transient stability studies were performed for only the post-Cluster high generation scenarios and voltage stability studies were performed for only the post-Cluster low generation scenarios.

2 Connection Alternatives

The AESO, in consultation with the Transmission Facility Owner (TFO) in the Study Area and the Market Participant (MP), examined 3 transmission alternatives to meet the MP's request for system access service for the Project.

[1] Decision 29258-D01-2026: Red Willow Solar Inc. – Red Willow Solar and Energy Storage Project, Proceeding 29258, Applications 29258-A001 to 29258-A003, January 23, 2026.

2.1 Connection Alternatives Examined

Below is a description of the developments associated with the transmission alternatives that were examined for the Project.

Alternative 1a – T-Tap connection to the 240 kV transmission line 9L20

This alternative includes the following developments:

- Add one 240 kV circuit, approximately 0.3 kilometers[2] in length, to connect the Facility to the existing transmission line 9L20 (between Nevis 766S and Cordel 755S substations) using a T-tap configuration; and
- Add or modify associated equipment as required for the above transmission developments.

Alternative 1b – In-and-Out connection to the 240 kV transmission line 9L20

This alternative includes the following developments:

- Add one 240 kV switching substation, including three 240 kV circuit breakers, connected to the existing 240 kV transmission line 9L20 (between Nevis 766S and Cordel 755S substations) using an in-and-out configuration;
- Add one 240 kV circuit, approximately 0.3 kilometer[3] in length, to connect the Facility to the new switching substation; and
- Add or modify associated equipment as required for the above transmission developments.

Alternative 2 – Radial 240 kV connection to Nevis 766S substation

This alternative includes the following developments:

- Add one 240 kV circuit, approximately 36 kilometers[4] in length, to connect the Facility to the existing Nevis 766S substation using a radial configuration;
- Modify Nevis 766S substation, including adding one 240 kV circuit breaker; and
- Add or modify associated equipment as required for the above transmission developments.

2.2 Connection Alternatives Selected for Further Study

Alternatives 1a and 1b were considered technically feasible and were selected for further studies.

[2] Exact line length to be determined by the TFO

[3] Exact line length to be determined by the TFO.

[4] Exact line length to be determined by the TFO.

3 Assessment of Connection Alternatives

3.1 Selection of Preferred Alternative

Alternative 1a results in similar system performance to Alternative 1b. Alternative 1b was ruled out as it involves increased transmission development, and hence increased cost, compared with Alternative 1a.

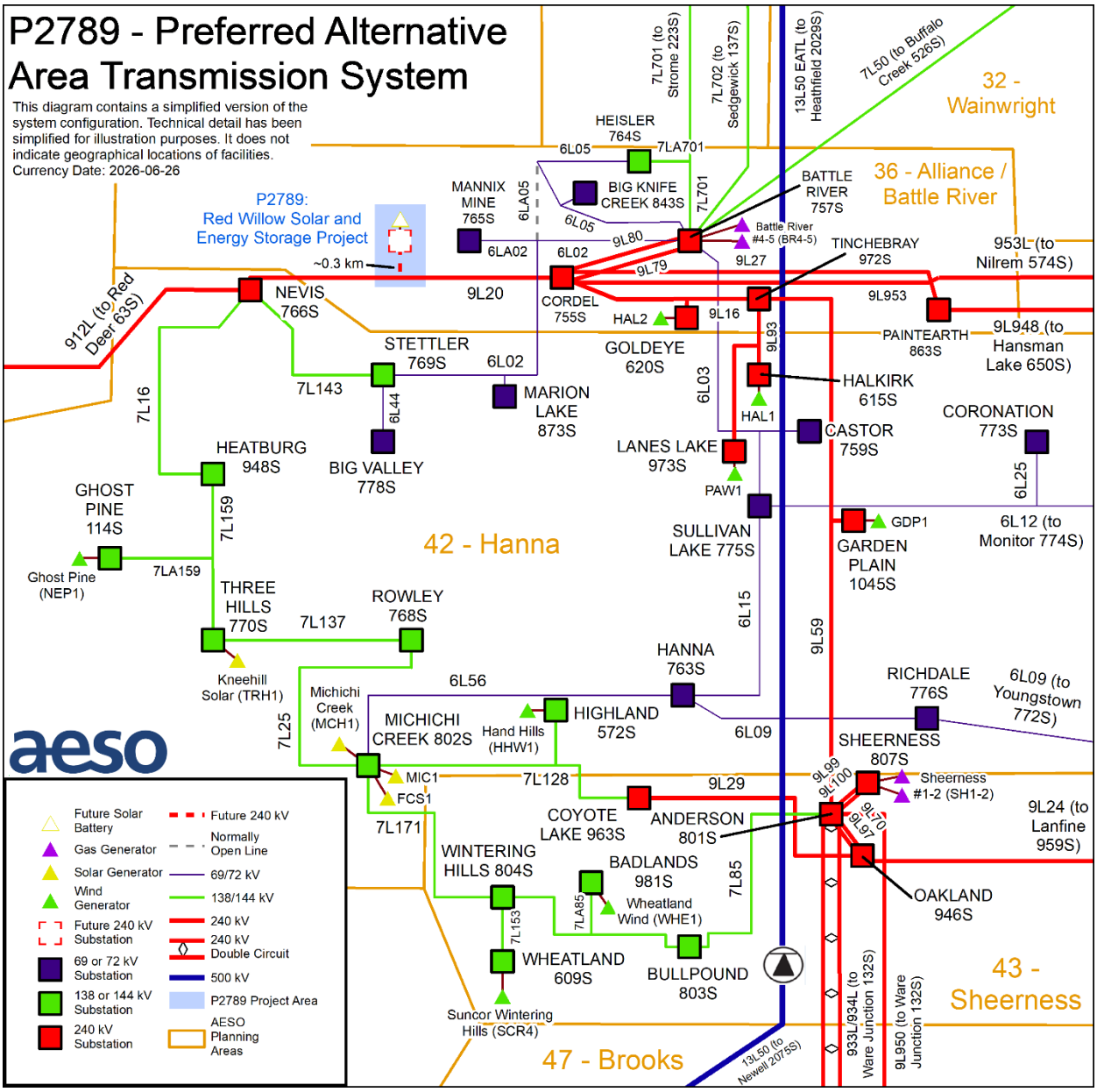
Alternative 2 involves increased transmission development, and hence increased cost, land and environmental impact, compared with Alternative 1a. Therefore, Alternative 2 was ruled out.

Therefore, the AESO has selected Alternative 1a as the preferred connection alternative to respond to the Market Participant's request for system access service.

The conductor used for the 240 kV circuit connecting the Facility to 9L20 should have a minimum thermal rating of 250 MVA to accommodate the MP's requested *Supply Transmission Service* (STS) contract capacity.

The proposed connection configuration for this alternative is shown in Figure 3-1.

Figure 3-1: Preferred Connection Alternative



3.2 Summary of Cluster Study Results for Alternative 1a

This section summarizes the results of the detailed cluster assessment, which is included under separate cover. The study results are based on the forecast, as well as the planned projects (load and generation) that are included in the studies.[5]

[5] As other projects move through the AESO Connection Process, the AESO may conduct additional studies for the Project to determine if new mitigation measures or modifications to the initial mitigation measures specified in the Functional Specification are required. Such mitigation measures, if feasible and required, must be implemented by the in-service date of the Project. The AESO will discuss

Category A Conditions

The pre-Cluster and post-Cluster power flow studies identified a number of thermal criteria violations under Category A conditions. All of the thermal criteria violations observed were exacerbated in the post-Cluster scenarios compared to the pre-Cluster scenarios.

Category B Conditions

The pre-Cluster and post-Cluster power flow studies identified a number of thermal violations under Category B condition. All of the thermal criteria violations observed in the STS scenario were exacerbated in the post-Cluster scenarios compared to the pre-Cluster scenarios. No Category B violations were observed in the Demand Transmission Service scenario.[6]

Mitigation Measures

The most effective generators in the study area were dispatched down to alleviate the thermal criteria violations observed under Category A system conditions. Due to high contribution of this Facility to the thermal criteria violations in the area, generation curtailment under the Category A condition may be required for the Facility in real time.

Thermal criteria violations under Category B can be mitigated by using existing, planned and/or new RASs[7] in the study area and real-time operational practices, alone or in combination, as appropriate.

The Constraint Summary Table in the Detailed Assessment Report describes the mitigation measures in more detail.

The Category A violations will be mitigated through the use of real-time operational practices, which include applying the procedures set out in Section 302.1 of the ISO rules, *Real Time Transmission Constraint Management* (the TCM Rule), to curtail generation as required. The need for system developments to address Category A violations will be assessed according to the forthcoming Optimal Transmission Planning (OTP) framework.

At this time, no RASs have been identified in the Functional Specification for the Project. Connecting the Project with the preferred connection alternative does not adversely affect the performance of the AIES.

any proposed changes and/or additions with the market participant and the TFO prior to specifying new or modified mitigation measures.

[6] The requested rate DTS was reduced from 100 MW to 5 MW after the completion of the studies. The AESO determined that the DTS reduction would not have material impact on the connection alternative, the mitigation measures or the conclusions of the studies.

[7] No new RAS assigned to P2789